CHILD TRACKING SYSTEM USING GPS AND ARDUINO

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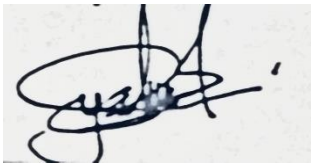
I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Computer System & Networking).



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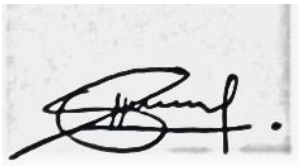

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ABSTRACT

Child Tracking System using GPS and Arduino was developed to help parents in monitoring their children and hence, reduce the number of missing child cases in Malaysia. This system will involve the uses of GPS (Global Positioning System), GSM (Global System for Mobile Communication), vibration tilt sensor, and Arduino Uno Microcontroller. In this application, GPS will help to determine coordinates of the child's location in latitude and longitude with the help of Google maps directly to parents's smart phone. Then, GSM will send the child's location to parent's smart phone via Short Messaging System (SMS). An application will be developed for this project to allow parents to view their child current location using their smart phone. In this project, the vibration tilt sensor which is embedded in the child's smart watch will detect the shaking or struggle of their child to ensure the safety of the child. The vibration tilt sensor will measure the bandwidth of vibration and send shaking's signal to Arduino Uno Microcontroller. Then, the Arduino Uno Microcontroller will send alert message to Parent according to the amount of bandwidth of shaking's signal received from vibration tilt sensor. Hence, the parent would be notified by the condition of their child whether they are safe or not. The methodology used in this project development is using Rapid Application Development (RAD). This Child Tracking System will be developed by using the mobile application systems that need to be installed by the user especially parents and it will be connected to the prototype of smart watch for child.

ABSTRAK

Sistem Penjejakan Kanak-Kanak menggunakan GPS dan Arduino telah dibangunkan untuk membantu ibu bapa dalam memantau anak-anak mereka dan dengan itu mengurangkan jumlah kes kanak-kanak yang hilang di Malaysia. Sistem ini akan melibatkan penggunaan GPS (Global Positioning System), GSM (Global System for Mobile Communication), sensor kecondongan getaran dan Arduino Uno Microcontroller. Dalam aplikasi ini, GPS akan membantu menentukan koordinat lokasi kanak-kanak di latitud dan longitud dengan bantuan peta Google terus ke telefon pintar ibu bapa. Kemudian, GSM akan menghantar lokasi kanak-kanak ke telefon pintar ibu bapa melalui Sistem Pesanan Ringkas (SMS). Permohonan akan dibangunkan untuk projek ini untuk membolehkan ibu bapa melihat lokasi semasa anak mereka menggunakan telefon pintar mereka. Dalam projek ini, sensor kecondongan getaran yang tertanam dalam jam pintar kanak-kanak akan mengesan gegaran atau perjuangan anak mereka untuk memastikan keselamatan kanak-kanak itu. Sensor kecondongan getaran akan mengukur jalur lebar getaran dan menghantar isyarat gemetar ke Mikrokontroller Arduino Uno. Kemudian, Mikrokontroler Arduino Uno akan menghantar mesej amaran kepada Ibu Bapa mengikut jumlah jalur lebar isyarat goncangan yang diterima daripada sensor kecondongan getaran. Oleh itu, ibu bapa akan dimaklumkan oleh keadaan anak mereka sama ada mereka selamat atau tidak. Metodologi yang digunakan dalam pembangunan projek ini menggunakan Pengembangan Aplikasi Rapid (RAD). Sistem Penjejakan Kanak-Kanak ini akan dibangunkan dengan menggunakan sistem aplikasi mudah alih yang perlu dipasang oleh pengguna terutama ibu bapa dan ia akan disambungkan kepada prototaip jam pintar untuk kanak-kanak.

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LIST OF ABBREVIATIONS

GPS	Global Positioning System
GSM	Global System for Mobile Communication
IDE	Integrated Development Environment
IOS	Internetwork Operating System
RAD	Rapid Application Development
SMS	Short Messaging System
SDLC	Software Development Life Cycle
WIFI	Wireless Fidelity

CHAPTER 1

INTRODUCTION

1.1 Introduction

Over the years our country, Malaysia has been bombarded with abundance of abduction or missing child cases. Based on police statistics, a total of 2015 children was reported missing in 2014, 1782 cases reported in 2015 and 1803 cases reported in 2016 (Times, 2017). Furthermore, based on the latest statistics, Malaysian police reveals that on average, a total of four children go missing every day in our country (Star, 2017). There were 723 cases of missing children have been recorded in just the first six months of 2017 which is about 181 days. Of the 723 cases, 447 were girls and 276 were boys. It is so sad to acknowledge that 345 cases of missing children have been successfully found, while 378 are still missing. The data was collected until June, 2017, thus the abduction or missing child cases will keep on happen. This show that how serious of our country on the abduction or missing child cases (Online, 2017).

Moreover, child abduction is an alarming and life changing event that has terrified many children's, parents and love ones. Child abduction is every parent's worst nightmare. It could happen in anywhere such as in the playground, theme park, shopping malls, yard or even their child's school. The terrifying truth is that child abduction could happen almost anywhere in the world. Hence, it is important for parents to take care of their own child. They need to make sure their child is safe when going out to anywhere at all time despite of their busy working day.

Monitoring child's activities is not an easy job for parents especially when they are not with their child such as working and outstation. In order to solve this problem, I have proposed a child tracking system that would help parents to monitor their child from remotely. The child tracking system with smart watch would help parents to monitor the safety of their child by having an interaction with them in real-time communication using the mobile application and system that need to be installed by parents and their child with internet connection. Parents need to install the child tracking system in their smart phones meanwhile their child just need to wear the smart watch in order to interact with each other. The child tracking system with smart watch would features GPS tracking that will allow parents to view the location of their child at any time. Parents can stay connected with their child by using the child tracking system with smart watch as it is easy to use, convenience and save a lot of time. Therefore, the child tracking system with smart watch is the best solution for parents to monitor their child from remotely.

1.2 Problem Statement

There are three problem statement that is identified which is many cases of missing children, less implement of smart watch with GPS tracking features in Malaysia and high cost of existing child tracking system.

i. Back in the day, child tracking devices do not exist. Parents usually are almost helpless when their child is lost. They need to rely on the police and the community to give them the good news. Therefore, when there is no child tracking system, the parents are unable to detect when their child wander off and leaves the safe zone. Besides, the parents are also unable to interact with their child when they are working or away from their child. As a result, when there is no child tracking system, parents are unable to know when their child is in an emergency situation. They also cannot interact and monitor their child in a quick time.

ii. Apart from that, other problem that arise is less implement of smart watch with GPS tracking features in Malaysia. According to my research, I have

found that the smart watch with GPS tracking features is less implemented in Malaysia compared to other developed countries such as United State of America (USA) and United Kingdom (UK). So, it is important to develop the child tracking system that have suitable features in Malaysia. Moreover, without the child tracking system, the parents could not identify the exact location of child when they lost track of their child in crowded places such as playground, theme parks and beaches. Thus, it is hard for parents to monitor the safety of their child at all time from remotely.

iii. Lastly, the identified problem is high cost of smart watch with GPS features tracking. Other countries especially the developed countries such as United State of America (USA) and United Kingdom (UK), they do import their product of smart watch for child to another country but it will require a high cost for Malaysians to buy. Even though their product offers a smart watch for child with more advanced features, it requires a high cost for the user from other countries to buy. On the other hand, the proposed system, child tracking system will offer user a smart watch for child with the necessary features and with a lower cost. In addition, by just using the smart watch to monitor their child safety allow the child more freedom while being watched.

All of these problem statement can be summarized as shown in the Table 1:

Table 1 Problem in Monitoring Child Safety

No	Problem	Description	Effect
1	Many cases of missing children	During emergency, parents unable to get instant response. Parents also unable to interact with their child when they are working	Parents unable to know when their child is in an emergency situation. They also cannot interact and

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